

R. W. ANDERSON

60 KC CONVERTER

MODEL 523

R. W. ANDERSON



TEXTRAN

PRODUCTS

AUSTIN, TEXAS

MANUFACTURED BY

TRACOR

INC.

Manual on Operation of the

TEXTRAN

Model 523 60 kc Converter

17 February 1964

TRACOR, Inc.

1701 Guadalupe

Austin, Texas

WARRANTY

TRACOR Incorporated warrants each instrument manufactured by them to be free from defects in material and workmanship. Our obligation under this warranty is limited to repairing or replacing any instrument or parts thereof, which shall be returned to us by the original purchaser, transportation charges prepaid, when upon our examination it is disclosed to our satisfaction to be defective. This warranty is effective for one year after delivery to the original purchaser. If the fault has been caused by misuse or abnormal conditions of operation, repair will be made at cost. In this case, an estimate will be submitted before work is started.

If any fault develops, notify TRACOR Incorporated giving full details including Model Number and Serial Number. We will then notify you of the disposition of the defective instrument.

TRACOR Incorporated
Manufacturing Division
Walnut 6-0220

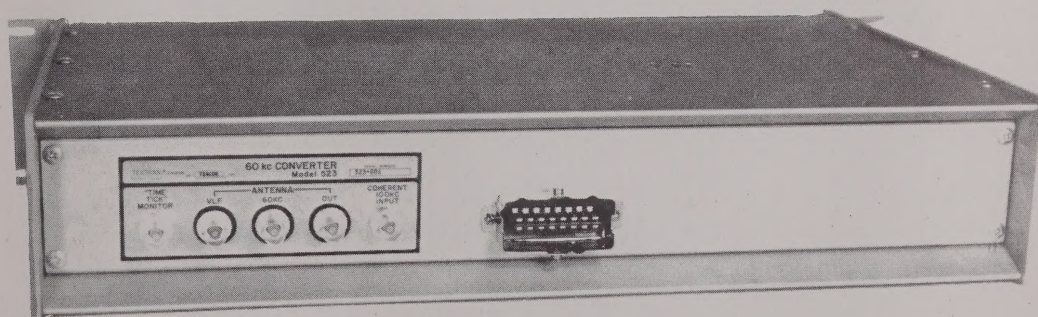
6500 TRACOR Lane
Austin, Texas
78721

TABLE OF CONTENTS

Title	Section	Page
INTRODUCTION: APPLICATION	1 -	1
SPECIFICATIONS	2 -	1
General	2 -	1
Performance	2 -	2
Mechanical	2 -	2
SYSTEM DESCRIPTION	3 -	1
THEORY OF OPERATION	4 -	1
General	4 -	1
Circuit Description	4 -	2
MAINTENANCE	5 -	1
REPLACEABLE PARTS	6 -	1
Vendor List	6 -	2
PCB-C599-264	6 -	3
Chassis	6 -	9
SCHEMATIC AND CIRCUIT DIAGRAMS	7 -	1



FRONT VIEW



BACK VIEW

SECTION 1

INTRODUCTION: APPLICATION

The Textran Model 523 60 kc Converter, when used with a Textran Series 599 VLF Phase Tracking Receiver, provides a means of phase-tracking WWVB at 60 kc as well as the VLF stations normally tracked by the receiver. It also provides time information by making the detected 60 kc envelope modulation available either for visual presentation on an oscilloscope or as an audible signal produced by the loudspeaker mounted in the unit. Front panel controls are provided for selecting the mode of operation -- either VLF or 60 kc, for adjusting the level of the 1 kc "time tick" monitor signal and for disabling the speaker when the audio signal is not desired.

Conversion of the 60 kc input signal to a coherent 15 kc signal and detection of the 1 kc envelope is accomplished with a plug-in printed circuit board. The receiver furnishes regulated +10 Vdc and -10 Vdc required to power the converter. It also furnishes coherent 100 kc required by the converter.

SECTION 2

SPECIFICATIONS

General

OPERATION MODE SELECTIONS - A front panel switch selects either 60 kc operation, providing a coherent 15 kc signal to the antenna input of the receiver, or normal VLF operation in which the normal VLF antenna is fed straight through to the receiver.

LEVEL - A front panel control permits simultaneous level adjustment of the "time tick" monitor and of the audio signal from the speaker.

SPEAKER SWITCH - ON/OFF switch on the front panel controls the internal speaker.

ANTENNA INPUTS - For use of separate antennas for 60 kc and VLF, which is recommended in some cases. However, in most instances the unit can be wired for use with a single antenna.

"TIME TICK" MONITOR - Binding posts on the front panel permit monitoring the detected and filtered 1 kc amplitude modulation which is present on the 60 kc carrier at one second intervals. An internal loudspeaker provides auditory monitoring of the same signal.

100 kc "REFERENCE" - Coherent 100 kc from the receiver for use in the converter is supplied through a connector on the rear panel.

POWER REQUIREMENTS - Through a connector on the rear panel, the plus and minus 10 volts dc required for operation of the converter is derived from the receiver or from another suitable external power supply.

OUTPUT TO RECEIVER - A jack on the rear panel permits feeding the output of the converter directly to the receiver antenna input.

The converter output is the RF signal direct from the VLF antenna when operating in the VLF mode and is a coherent 15 kc signal when operating in the 60 kc mode.

Performance

SENSITIVITY AT 60 kc - About 13 dB gain.

LIMITATIONS WITH REGARD TO VARIOUS TYPES OF TRANSMISSIONS - Rejection at 90 kc is greater than 30 dB. At low signal levels, an undesirable offset is observed in the phase error signal of the receiver unless a narrow band, plug-in filter is used in the front end of the receiver module.

BANDWIDTH - 5 kc

Mechanical

DIMENSIONS - 17" wide x 3 1/2" high x 9 1/3" deep, with handles protruding 1 3/16" forward on each side. Angle brackets are provided for conversion to standard 19" RETMA relay rack mounting.

WEIGHT - 6 1/4 lbs.

CONSTRUCTION - Stressed skin frame with hinged front panel to permit access to internally mounted printed circuit cards. Shadow panel on rear provides protection for jacks, etc.

SECTION 3

SYSTEM DESCRIPTION

Figure 1 is a block diagram showing the interconnections between the Textran Model 523 60 kc Converter and a Textran Series 599 VLF Receiver, the normal VLF antenna and the 60 kc whip antenna.

The VLF antenna (normally a Series 599-600 VLF Loop Antenna) is connected to the VLF antenna input jack (J4), the "60 kc" antenna to its input jack (J5), and the receiver's antenna input jack is connected to the "antenna OUT" jack (J3). Coherent 100 kc from the receiver, which is required for coherent conversion of the 60 kc signal, is connected to the coherent 100 kc input jack (J2). A power cable from the receiver is connected to the latching shell receptacle (J1) on the back panel, (+) 10 Vdc to pin 7, (-) 10 Vdc to pin 8 and common to pin 16. For monitoring the 60 kc time pulse, there is the "time tick" monitor jack (J6) on the rear panel or the "time tick" binding posts (E1 & E2) on the front panel. The level at either monitoring point can be adjusted by varying the level control (R1) on the front panel, which also controls the level of the audible signal available from the loudspeaker. The loudspeaker can be switched ON or OFF as desired.

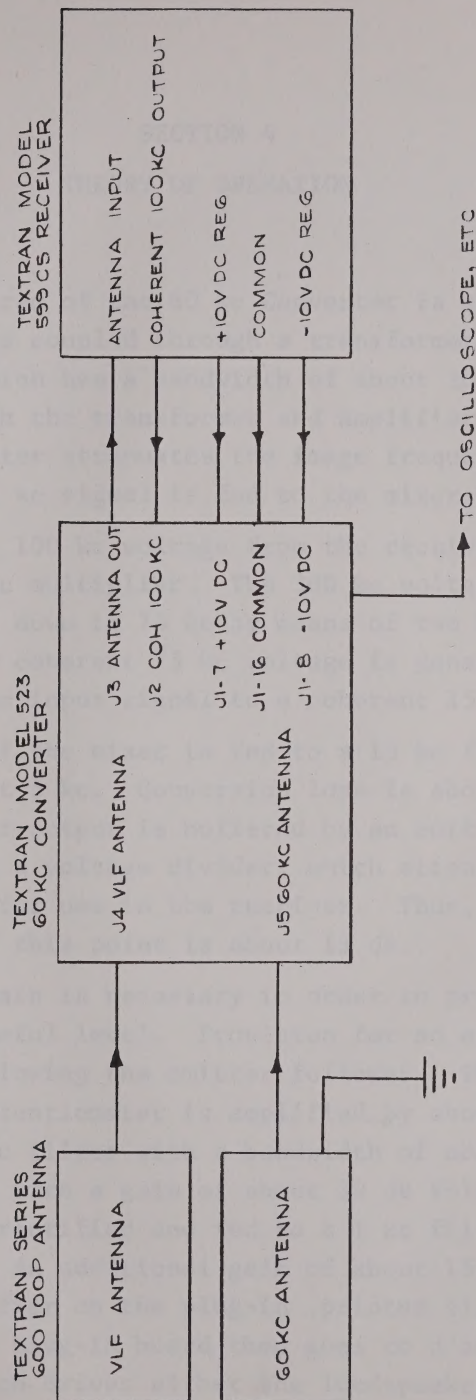


Fig. 1 SYSTEM BLOCK DIAGRAM

SECTION 4

THEORY OF OPERATION

General

A block diagram of the 60 kc Converter is shown in Figure 2. The antenna input is coupled through a transformer to the 60 kc tuned amplifier, which has a bandwidth of about 10 kc. Total voltage gain through the transformer and amplifier is about 59 dB. The 90 kc notch filter attenuates the image frequency at least 30 dB. Then the 60 kc signal is fed to the mixer.

The coherent 100 kc voltage from the receiver is fed to the 100 kc to 300 kc multiplier. The 300 kc voltage is then limited and divided down to 75 kc by means of two bistable multivibrators. Thus, a coherent 75 kc voltage is generated for converting the 60 kc input signal to a coherent 15 kc signal.

The output of the mixer is fed to a 15 kc filter with a bandwidth of about 5 kc. Conversion loss is about 9 dB. For isolation, the mixer output is buffered by an emitter follower before being fed to a voltage divider, which attenuates the 15 kc signal about 37 dB for use in the receiver. Thus, the total gain of the converter to this point is about 13 dB.

Additional gain is necessary in order to present time information at a useful level. Provision for an external gain control is made following the emitter follower. The output of the gain control potentiometer is amplified by about 34 dB and fed to another 15 kc filter with a bandwidth of about 5 kc. An isolating amplifier with a gain of about 30 dB follows the filter. The signal is then rectified and fed to a 1 kc filter with a 500 cps bandwidth. An additional gain of about 15 dB is provided in the output amplifier on the plug-in printed circuit board. The signal from the plug-in board then goes to a small audio power amplifier which drives either the loudspeaker or a fixed

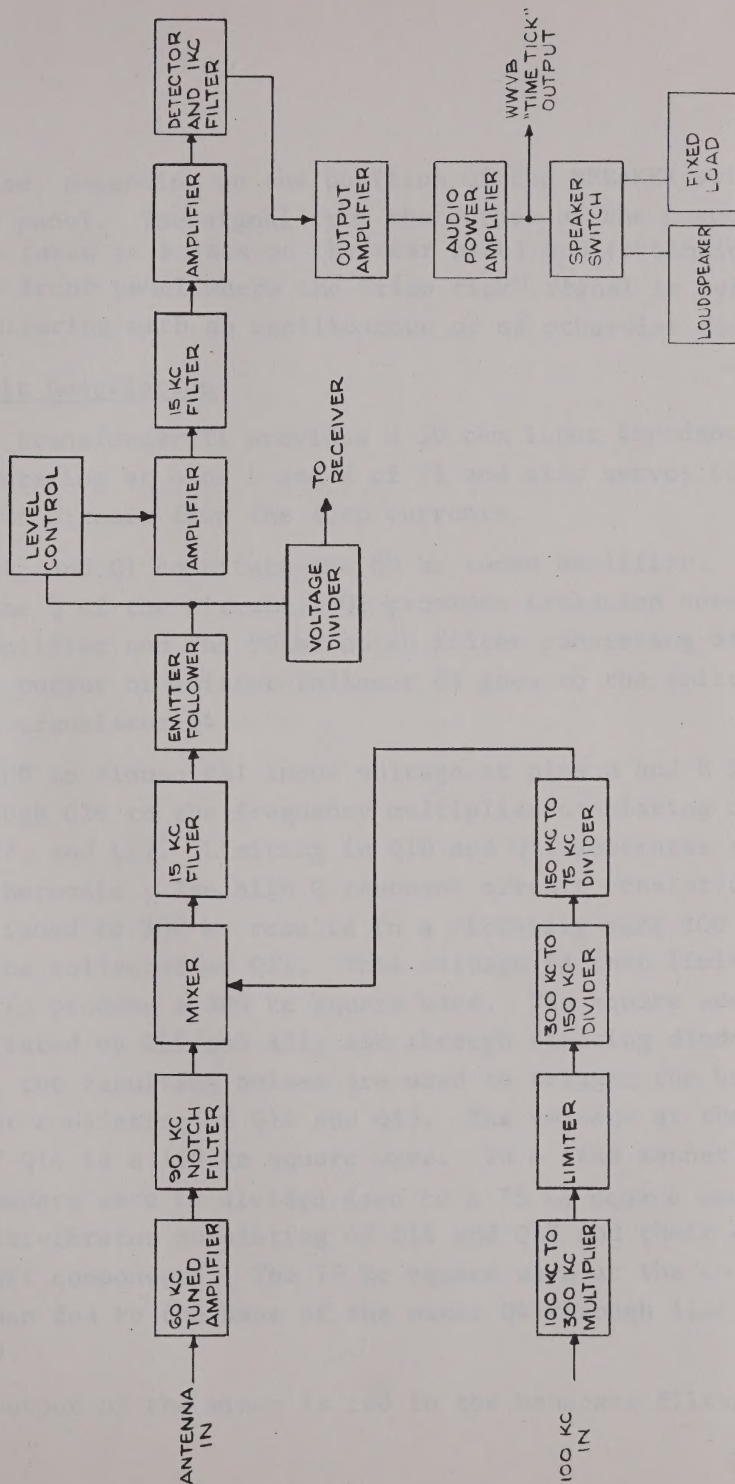


Fig. 2 BLOCK DIAGRAM OF MODEL 523
60 KC CONVERTER

resistive load, depending on the position of the SPEAKER switch on the front panel. The signal from the output of the power amplifier is also taken to a jack on the rear panel and to binding posts on the front panel where the "time tick" signal is available for monitoring with an oscilloscope or as otherwise desired.

Circuit Description

Input transformer T1 provides a 50 ohm input impedance to the signal entering at pins L and K of P1 and also serves to isolate the input circuit from the loop currents.

Q1, L1, and C1 constitute the 60 kc tuned amplifier. R3 determines the Q of the circuit. Q2 provides isolation between the tuned amplifier and the 90 kc notch filter consisting of L2 and C6. The output of emitter follower Q3 goes to the emitter of the mixer transistor Q4.

The 100 kc sinusoidal input voltage at pins H and E is coupled through C26 to the frequency multiplier consisting of Q10, Q11, C27, and L11. Limiting in Q10 and Q11 generates a large third harmonic. The high Q resonant circuit consisting of C27 and L11 tuned to 300 kc results in a virtually pure 300 kc voltage at the collector of Q11. This voltage is then limited by Q12 and Q13 to produce a 300 kc square wave. The square wave is differentiated by C29 and R31; and through steering diodes CR2 and CR3, the resulting pulses are used to trigger the bistable multivibrator consisting of Q14 and Q15. The voltage at the collector of Q14 is a 150 kc square wave. In a like manner, the 150 kc square wave is divided down to a 75 kc square wave by the bistable multivibrator consisting of Q16 and Q17 and their associated circuit components. The 75 kc square wave at the collector of Q16 is then fed to the base of the mixer Q4 through limiting resistor R49.

The output of the mixer is fed to the bandpass filter

consisting of L3, C9, L4, C10, L5, and C11 and centered at 15 kc. Emitter follower Q5 provides isolation. The output of Q5 is coupled through C12 to the voltage divider consisting of R12 and R13. The attenuated signal is then fed to pin P of P1 and eventually to the receiver input for phase tracking.

For gain control and additional amplification, the signal at the emitter of Q5 is also fed to an external gain control and then to amplifier Q6. Its output is passed through another bandpass filter consisting of L6, C15, L7, C16, L8, and C17 and centered at 15 kc. Isolation and additional amplification is provided by Q7. The output of Q7 is rectified by CR1 and passed through the bandpass filter consisting of L9, C19, C20, C21, and L10 and tuned to 1 kc. The detected and filtered 1 kc modulation on the carrier is then fed to emitter follower Q8. The output of Q8 is available at pin Z of P1. R53 is provided so that the signal can be reduced to a lower level, compatible with the levels required in the audio circuits of the Textran 599CS Receiver, for use in certain applications. The emitter follower output is also amplified by Q9 with a gain of approximately 15 dB. The output of Q9 is coupled through C25 to pin S of P1. At this point the time pulse amplitude is suitable for viewing with an oscilloscope or for driving an external power amplifier and speaker.

In the Model 523 60 kc Converter, the signal from pin S of P1 drives the input of the power amplifier PCB 599-316.

SECTION 5

The Textran Model 523 60 kc Converter requires no periodic maintenance.

The transistor circuits used in this equipment are designed for reliable trouble-free operation. No maintenance problems are likely to occur during normal continuous operation.

The TRACOR engineering staff will be glad to provide technical assistance at all times. Inquiries can be addressed to

TRACOR, Inc.
Attn: Dr. O. J. Baltzer
1701 Guadalupe
Austin 1, Texas
Area Code 512 Greenwood 6-6601

SECTION 6

REPLACEABLE PARTS

The tables in this section list all replaceable parts in the 60 kc Converter, except minor items of hardware:

Table 1	Table of Replaceable Parts, 60 kc Converter Board, PCB-C599-264
Table 2	Table of Replaceable Parts, 60 kc Converter, Chassis

Parts manufacturers are referenced in the fourth column of each table by a vendor's code. The TRACOR vendor code key is given on the following page.

NOTE: The vendor code and manufacturer part number are included for the convenience of the user in ordering replacement parts locally. When ordering replacement parts from TRACOR, INCORPORATED, please specify REFERENCE DESIGNATOR, Value and DESCRIPTION. For example:

2 ea C 207 100 mfd Capacitor, tant.,
 $\pm 20\%$, 10 wvdc

Part numbers will change occasionally as vendors are changed or as better components are selected. The latest component will be shipped.

TRACOR VENDOR CODE

<u>CODE #</u>	<u>VENDOR</u>
V1001	Allen-Bradley Co., 136 W. Greenfield Ave., Milwaukee 4, Wis.
V1002	Amphenol-Borg Electronics Corp., 1830 S. 54th Ave., Chicago 50, Ill.
V1004	Centralab Electronic Div., Globe-Union, Inc., 994 E. Keefe Ave., Milwaukee 1, Wis.
V1006	Cutler-Hammer, Inc., 321 North 12th St., Milwaukee 1, Wis.
V1018	Sprague Products Co., 481 Marshall St., North Adams, Mass.
V1021	Texas Instruments, Inc., Semiconductor-Components Div., 13500 N. Central Expressway, P.O.Box 5012, Dallas 22, Texas
V1023	United Transformer Co., 150 Varick St. New York 13, N. Y.
V1039	Capco Div., TexTool Products, Inc., 1410 Sowers Road, Irving, Tex.
V1042	Hughes Aircraft Co., Semiconductor Div., 500 Superior Ave., Newport Beach, Calif.
V1047	Motorola Semiconductor Products, Inc., 5005 East McDowell Road, Phoenix 8, Arizona
V1051	Ohmite Mfg. Co., 3601 West Howard St. Skokie, Ill.
V1063	Delevan Electronics, 270 Quaker Road, East Aurora, N. Y.
V1064	Arco Electronics, Inc., Community Drive, Great Neck, N. Y.
V1072	Sangamo (Technitrol, Inc.) Electric Co., Electronic Products 1207 N. 11th St., Springfield, Ill.
V1081	Superior Electric Co., 383 Middle St., Bristol, Conn.
V1082	Quam-Nichols Co., 234 E. Marquette Rd., Chicago 37, Ill.

Table 1: Converter Board PCB-C599-264

REF.	VALUE	DESCRIPTION	VENDOR	PART #
C1	1200 mmf	Capacitor, Silver Mica, ± 5%, 500 WVDC	V1064	DM-19-122J
C2	0.47 mf	Capacitor, Disc Cer., -20+80%, 3 WVDC	V1018	HY-130
C3	0.05 mf	Capacitor, Disc Cer., -20+80%, 50 WVDC	V1018	TG-S50
C4	0.05 mf	Capacitor, Disc Cer., -20+80%, 50 WVDC	V1018	TG-S50
C5	100 mf	Capacitor, Tantalum, ± 20%, 10 WVDC	V1021	SCM107GP010A4
C6	750 mmf	Capacitor, Silver Mica, ± 5%, 300 WVDC	V1064	DM-15-751J
C7	0.05 mf	Capacitor, Disc Cer., -20+80%, 50 WVDC	V1018	TG-S50
C8	100 mf	Capacitor, Tantalum, ± 20%, 10 WVDC	V1021	SCM107GP010A4
C9	0.033 mf	Capacitor, Mylar, ± 5%, 200 WVDC	V1039	MW33325
C10	470 mmf	Capacitor, Silver Mica, ± 5%, 300 WVDC	V1064	DM-15-471J
C11	0.033 mf	Capacitor, Mylar, ± 5%, 200 WVDC	V1039	MW33325
C12	10 mf	Capacitor, Tantalum, ± 20%, 20 WVDC	V1021	SCM106BP020A4
C13	0.47 mf	Capacitor, Tantalum, ± 20%, 35 WVDC	V1021	SCM474FP035A4
C14		Not Used		
C15	0.033 mf	Capacitor, Mylar, ± 5%, 200 WVDC	V1039	MW33325
C16	470 mmf	Capacitor, Silver Mica, ± 5%, 300 WVDC	V1064	DM-15-471J
C17	0.033 mf	Capacitor, Mylar, ± 5%, 200 WVDC	V1039	MW 33325
C18	0.47 mf	Capacitor, Tantalum, ± 20%, 35 WVDC	V1021	SCM474FP035A4
C19	6800 mmf	Capacitor, Silver Mica, ± 5%, 100 WVDC	V1064	DM-19-682J
C20	10,000 mmf	Capacitor, Silver Mica, ± 5%, 100 WVDC	V1064	DM-20-103J
C21	6800 mmf	Capacitor, Silver Mica, ± 5%, 100 WVDC	V1064	DM-19-682J
C22	4.7 mf	Capacitor, Tantalum, ± 20%, 10 WVDC	V1021	SCM475FP010A4
C23	4.7 mf	Capacitor, Tantalum, ± 20%, 10 WVDC	V1021	SCM475FP010A4
C24		Not Used		

REF.	VALUE	DESCRIPTION	VENDOR	PART #
C25	4.7 mf	Capacitor, Tantalum, $\pm 20\%$, 10 WVDC	V1021	SCM475FP010A4
C26	0.05 mf	Capacitor, Disc Cer., -20+80%, 50 WVDC	V1018	TG-S50
C27	270 mmf	Capacitor, Silver Mica, $\pm 5\%$, 500 WVDC	V1064	DM-15-271J
C28	0.05 mf	Capacitor, Disc. Cer., -20+80%, 50 WVDC	V1018	TG-S50
C29	470 mmf	Capacitor, Silver Mica, $\pm 5\%$, 300 WVDC	V1064	DM-15-471J
C30	470 mmf	Capacitor, Silver Mica, $\pm 5\%$, 300 WVDC	V1064	DM-15-471J
C31	470 mmf	Capacitor, Silver Mica, $\pm 5\%$, 300 WVDC	V1064	DM-15-471J
C32	100 mmf	Capacitor, Silver Mica, $\pm 5\%$, 500 WVDC	V1064	DM-15-101J
C33	470 mmf	Capacitor, Silver Mica, $\pm 5\%$, 300 WVDC	V1064	DM-15-471J
C34	470 mmf	Capacitor, Silver Mica, $\pm 5\%$, 300 WVDC	V1064	DM-15-471J
C35	0.05 mf	Capacitor, Disc Cer., -20+80%, 50 WVDC	V1018	TG-S50
CR1		Diode, Ge	V1042	IN96
CR2		Diode, Ge	V1042	IN96
CR3		Diode, Ge	V1042	IN96
CR4		Diode, Ge	V1042	IN96
CR5		Diode, Ge	V1042	IN96
L1	4.7 mh	Inductor, Iron Core, $\pm 5\%$	V1063	2500-60
L2	4.7 mh	Inductor, Iron Core, $\pm 5\%$	V1063	2500-60
L3	4.7 mh	Inductor, Iron Core, $\pm 5\%$	V1063	2500-60
L4	10 mh	Inductor, Iron Core, $\pm 5\%$	V1063	2500-76
L5	4.7 mh	Inductor, Iron Core, $\pm 5\%$	V1063	2500-60
L6	4.7 mh	Inductor, Iron Core, $\pm 5\%$	V1063	2500-60
L7	10 mh	Inductor, Iron Core, $\pm 5\%$	V1063	2500-76
L8	4.7 mh	Inductor, Iron Core, $\pm 5\%$	V1063	2500-60
L9	6.0 hy	Inductor, Hypermalloy Case, $\pm 3\%$	V1023	ML-7
L10	6.0 hy	Inductor, Hypermalloy Case, $\pm 3\%$	V1023	ML-7
L11	1 mh	Inductor, Iron Core, $\pm 5\%$	V1063	2500-28
Q1		Transistor, Ge, NPN	V1021	2N1304
Q2		Transistor, Ge, NPN,	V1021	2N1304
Q3		Transistor, Ge, NPN,	V1021	2N1304
Q4		Transistor, Ge, NPN, Bilateral Switching	V1021	2N1995
Q5		Transistor, Ge, NPN	V1021	2N1304

REF.	VALUE	DESCRIPTION	VENDOR	PART #
Q6		Transistor, Ge, NPN	V1021	2N1304
Q7		Transistor, Ge, NPN	V1021	2N1304
Q8		Transistor, Ge, NPN	V1021	2N1304
Q9		Transistor, Ge, NPN	V1021	2N1304
Q10		Transistor, Ge, NPN	V1021	2N1304
Q11		Transistor, Ge, NPN	V1021	2N1304
Q12		Transistor, Ge, NPN	V1021	2N1304
Q13		Transistor, Ge, NPN	V1021	2N1304
Q14		Transistor, Ge, NPN	V1021	2N1305
Q15		Transistor, Ge, PNP	V1021	2N1305
Q16		Transistor, Ge, PNP	V1021	2N1305
Q17		Transistor, Ge, PNP	V1021	2N1305
R1	1 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051	
R2	4.7 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051	
R3	15 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051	
R4	10 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051	
R5	4.7 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051	
R6	10 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051	
R7	10 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051	
R8	100 Ω	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051	
R9	100 Ω	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051	
R10	12 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051	
R11	2.2 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051	
R12	3.3 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051	
R13	47 Ω	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051	
R14	2.2 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051	
R15	1.8 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051	
R16	12 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051	
R17	2.2 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051	
R18	1.8 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051	
R19	47 Ω	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051	

REF.	VALUE	DESCRIPTION	VENDOR PART #
R20	10 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R21	10 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R22	15 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R23	2.2 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R24	1 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R25	2.2 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R26	10 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R27	4.7 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R28	100 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R29	2.2 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R30	2.2 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R31	1 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R32	10 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R33	5.6 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R34	27 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R35	1 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R36	100 Ω	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R37	5.6 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R38	27 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R39	1 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R40	1 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R41	10 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R42	5.6 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R43	27 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051
R44	1.8 K	Resistor, Fixed Comp., ± 10%, 1/2 W	V1051

REF.	VALUE	DESCRIPTION	VENDOR	PART #
R45	100 Ω	Resistor, Fixed Comp., $\pm 10\%$, 1/2 W	V1051	
R46	5.6 K	Resistor, Fixed Comp., $\pm 10\%$, 1/2 W	V1051	
R47	27 K	Resistor, Fixed Comp., $\pm 10\%$, 1/2 W	V1051	
R48	1.8 K	Resistor, Fixed Comp., $\pm 10\%$, 1/2 W	V1051	
R49	100 K	Resistor, Fixed Comp., $\pm 10\%$, 1/2 W	V1051	
R50	10 K	Resistor, Fixed Comp., $\pm 10\%$, 1/2 W	V1051	
R51	47 Ω	Resistor, Fixed Comp., $\pm 10\%$, 1/2 W	V1051	
R52	180 Ω	Resistor, Fixed Comp., $\pm 10\%$, 1/2 W	V1051	
T1		Transformer, Pulse, 3:1:1 Windings	V1072	G3WA
P1		Connector, Male Plug, 22 Contact	V1002	133-022-03
R53	100 K	Resistor, Fixed Comp., $\pm 10\%$, 1/2 W	V1051	

Table 2: Chassis

REF.	VALUE	DESCRIPTION	VENDOR	PART #
C4	10 mf	Capacitor, Aluminum Elec- trolytic, -10+100%, 25 vdcw	V1018	TE 1204
C6	.022 mf	Capacitor, Mylar, $\pm$ 10%, 200 vdcw	V1018	192P-22392
E1		Post, Binding, Dual, 5-way	V1018	DF30-2-BRC
E2		Post, Binding, Dual, 5-way	V1018	DF30-2-BRC
J1		Connector, Receptacle, Polar- ized, Latch Shell, 16 pin, male jack	V1002	26-4401-16P
J7		Socket, 22	V1002	143-022-01
LS1	3.2 Ω	Loudspeaker, permanent mag- net, 3 in sq.	V1001	RV4NAYSD102C
Q1		Transistor, NPN Silicon	V1047	2N2270
Q2		Transistor, NPN Silicon	V1047	2N2270
Q3		Transistor, NPN Silicon	V1047	2N2270
R1	1K Ω	Potentiometer, CW Log Taper	V1001	RV4NAYSD102C
R18	1.2K	Resistor, Fixed Comp., 10%, 1/4W	V1001	CB-1221
R19	56 Ω	Resistor, Fixed Comp., 10%, 1/4W	V1001	CB-5601
R20	56 Ω	Resistor, Fixed, Comp., 10%, 1/4W	V1001	CB-5601
R21	4.7K	Resistor, Fixed Comp., 10%, 1/4W	V1001	CB-4721
R22	100 Ω	Resistor, Fixed Comp., 10%, 1/4W	V1001	CB-1011
R23	1.2K	Resistor, Fixed Comp., 10%, 1/4W	V1001	CB-1221
R24	1.2K	Resistor, Fixed Comp., 10%, 1/4W	V1001	CB-1221
S1		Switch, Rotary, 6 pole, 2 pos.	V1004	PA-2018
S2		Switch, Toggle, SPDT	V1006	8282K14
T1		Transformer, Output 1600ct to 3.2 Ω	V1023	DOT-34

SECTION 7

SCHEMATIC AND CIRCUIT DIAGRAMS

Drawings are folded in a pocket inside the back cover of this manual.

B599-348

Schematic Diagram: Chassis of
Model 523 60 kc Converter;
VLF Accessories

D599-263

60 kc Converter: PCB-C599-264



Inse

Fold out

He

